MINGDONG LI

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The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong
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EDUCATION

The Hong Kong University of Science and Technology *Sep. 2021 - Aug. 2025 (expected)*
PhD in Individualized Interdisciplinary Program (Robotics and Autonomous System)
Academy of Interdisciplinary Studies
Computational Cognitive Engineering Lab
Supervisor: Prof. Yiwen WANG, Prof. Qifeng CHEN (co-supervision)

Heidelberg University *Dec. - Feb. 2025*
Visiting Student, BMBF Research Group at Interdisciplinary Center for Scientific Computing
Dynamical Systems and Artificial Intelligence Lab
Supervisor: Prof. Zahra Monfared

Zhejiang University *2018-2021*
Master of Mechanical Engineering
The State Key Lab of Fluid Power & Mechatronic Systems
Supervisor: Prof. Yixiong FENG

Tongji University *2013-2018*
Bachelor of Mechanical Design Manufacture and its Automation
Pilot Sino-German Program for Undergraduate in Mechanical Engineering (Honor Class)

RESEARCH EXPERIENCE AND INTEREST

Brain-machine Interfaces, Neural Signal Analysis, Point Process Modeling, NeuroAI, Wearable Device

WORKING PAPER

1. **Mingdong Li**, Zhiwei Song, Shuhang Chen, Xiang Zhang, Yiwen Wang*. Dynamic Functional Neural Connectivity Inference for Multi-Task Neuroprosthetic Control in a Point Process Filter, ***IEEE Transactions on Biomedical Engineering*** *(TBME). (under review)*
2. Shenghui Wu, Zhiwei Song, Jieyuan Tan, **Mingdong Li**, Xiang Zhang, Yifan Huang, Shuhang Chen, Xiang Shen, Ziyi Wang, Dario Farina, Jose Principe, Yiwen Wang*. Re-establishing neural functional connectivity with a generative spike prediction model using behavioral reinforcement, ***Nature Computational Science***. *(under revision)*
3. Zhiwei Song, Xiang Zhang, **Mingdong Li**, Jieyuan Tan, Yiwen Wang*. An Online Knowledge Transfer Framework for Task Learning in Brain-Machine Interfaces, ***IEEE Transactions on Neural Systems and Rehabilitation Engineering*** *(TNSRE). (under revision)*

PUBLICATION (JOURNAL)

1. **Mingdong Li**, Shuhang Chen†, Xiang Zhang, Yiwen Wang*. Neural Correlation Integrated Adaptive Point Process Filtering on Population Spike Trains, ***IEEE Transactions on Neural Systems and Rehabilitation Engineering*** *(TNSRE)*, 2025. *(†: co-first author)*
2. **Mingdong Li**, Shanhe Lou*, Hao Zheng, Yixiong Feng, Yicong Gao, Siyuan Zeng, Jianrong Tan. A Cognitive Analysis-based Key Concepts Derivation Approach for Product Design, ***Expert Systems With Applications*** *(ESWA)*, 2024.

3. **Mingdong Li**, Shanhe Lou*, Yicong Gao, Hao Zheng, Bingtao Hu, Jianrong Tan. A Cerebellar Operant Conditioning-inspired Constraint Satisfaction Approach for Product Design Concept Generation, ***International Journal of Production Research*** *(IJPR)*, 2023.
4. Xuanyu Wu, Zhaoxi Hong*, Yixiong Feng, **Mingdong Li**, Shanhe Lou, Jianrong Tan. A Semantic Analysis-driven Customer Requirements Mining Method for Product Conceptual Design, ***Scientific Reports*** *(Sci. Rep.)*, 2022.
5. Yixiong Feng, **Mingdong Li**, Shanhe Lou*, Yicong Gao, Jianrong Tan. A Digital Twin-Driven Method for Product Performance Evaluation Based on Intelligent Psycho-Physiological Analysis, ***ASME Journal of Computing and Information Science in Engineering*** *(JCISE)*, 2021.

PUBLICATION (CONFERENCE & ABSTRACT & PATENT)

1. **Mingdong Li**, Mingyi Wang, Yiwen Wang*. An Adaptive Superposition Point Process Model with Neuronal Encoding Engagement Identification, ***2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC).*** *(Oral)*
2. Zixu Wang, Shuhang Chen†, **Mingdong Li**, Yiwen Wang*. Tracking Dynamic Conditional Neural Correlation during Task Learning, ***2024 46th EMBC.*** *(Oral, †: co-first author)*
3. **Mingdong Li**, Shuhang Chen, Zhijia Zhao, Yiwen Wang*. Tracking the Dynamic Functional Neural Connectivity via Conjugate Gradient Optimization, ***2023 45th EMBC.*** *(Oral)*
4. **Mingdong Li**, Shuhang Chen, Xi Liu, Zhiwei Song, Yiwen Wang*. Modeling Neural Connectivity in a Point-Process Analogue of Kalman Filter, ***2022 44th EMBC.*** *(Oral)*
5. **Mingdong Li**, Jieyuan Tan, Zhiwei Song, Yiwen Wang*. Modeling Neural Population Dynamics in a Point Process Filter for Neuroprosthetics Control, ***Annual Conference of International Association of Neurorestoratology (IANR) 2024*** *(Abstract, Poster)*
6. Y. Feng, **Mingdong Li**, Y. Gao. CN110090818B, Chinese Patent Authorized, 2020
7. M. Li, Y. Zhang, N. Xu, **Mingdong Li**, S. Liu. CN106127958B, Chinese Patent Authorized, 2018

PRIZES AND ACHIEVEMENTS

1. DAAD AInet fellowship (AI4Science) *2024*
2. NextGen Scholar Award (IEEE Annual International Conference of EMBS) *2024*
3. Zhejiang University Dissertation-Year Fellowship (Top 1%) *2021*
4. ZHEJIANG Lab AI Competition (Multiple Objects Tracking track), Excellence Prize *2019*
5. 1st prize in No.7 National College Mechanical Design Innovation Competition *2016*
6. 1st prize in Shanghai College Mechanical Innovation Competition *2016*
7. Tongji Academic Scholarship, 2nd prize for 2 times and 3rd prize for 1 time *2013-2018*

INTERNSHIP

1. Anker Innovation, Dexterous Hands Lab, Research Intern *2025.04-2025.06*
   - Tactile sensor survey and planning
   - LangGraph-based Agent development for robotics talent seeking
   - Mujoco simulation for dexterous hands

PROJECT

1. Point process filtering and neural population coding for invasive BCI (PhD thesis) *2021-2025*
2. Memory encoding analysis, Beijing Tiantan Hospital-HKUST *2024.10-2025.01*
   - lead memory encoding analysis of Substantia Nigra for Parkinson's Disease

3. Managing surgery of implementing electrodes for rats *2023.9-2024.9*
   - organize surgery tutorials and surgery for more than 30 times
4. Managing rats behavioral training *2022.9-2023.9*
   - organize SD Rat two-lever discrimination training for more than 130 days
   - maintain and update devices for behavioral training and neural signal recording
5. Intelligent product scheme design (Master thesis) *2018-2021*
   - based on cognition analysis, NLP and EEG analysis
6. Matlab Mobile for step measurement and trajectory reconstruction based on IMU *2018*
7. Shanghai Undergraduate Innovation Program (as team leader) *2015-2016*
   - product design of a candy packing machine
   - lead task decomposition and structure modeling
   - pneumatic system design and control

PERSONAL SKILLS

Coding: Python/Matlab/C++/Pytorch toolbox
Product Design: AutoCAD/Inventor/Solidworks/Ansys
Surgery for implementing electrodes into M1 and mPFC of SD Rat
Establish system for animal behavioral training, neural signal recording and analysis
Language: Chinese, English, German

ACADEMIC SERVICE

Reviewer: EMBC, ISBI, NER, TIV
Programe committee, 4th International Workshop on Neural Engineering & Rehabilitation *2023.08*
Programe committee, 3rd International Workshop on Neural Engineering & Rehabilitation *2022.05*

TEACHING AND MENTORING

TA, EMIA4110 Practical Machine Learning *2024 Spring*
TA, ELEC4130 Machine Learning on Images *2023 Spring*
Mentoring: point process filtering for neural spiking signals (HKUST)
- Tianyi Hu, now undergraduate of University of Science and Technology of China *2024.6-2024.9*

Mentoring: surgery of implanting electrodes for rats (HKUST)
- Shicheng Qiu, now HKUST MPhil student *2023.9-2024.9*

Mentoring: cognitive analysis, language model, EEG analysis, academic writing (Zhejiang Uni.)
- Xuanyu Wu, now PhD candidate of Zhejiang Uni. *2020.9-2022.9*

INTERNATIONAL COLLABORATION

Prof. Jose Principe, University of Florida
Prof. Camilo Libedinsky, National University of Singapore
Prof. Zahra Monfared, Heidelberg University